Data General

Customer Documentation

Diagnostic Program User's Guide

MP MASTER

MA25701

Diagnostic Program User's Guide

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Diagnostic Program User's Guide

014-002123-00

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INTRODUCTION

This manual is intended for use by technicians. End-users, however, will also find it useful because of its user-friendliness. It contains all the information needed to diagnose your system. This diagnostic program is menu-driven with instructions included, making it easy to operate the program.

NOTE: *The diagnostic program covers several types of computers — XTs, ATs, 386(SX)-based, 486(SX)-based, laptops, and notebooks. Therefore, the screens shown in this manual serve only as a sample screen.*

STARTING THE DIAGNOSTIC PROGRAM

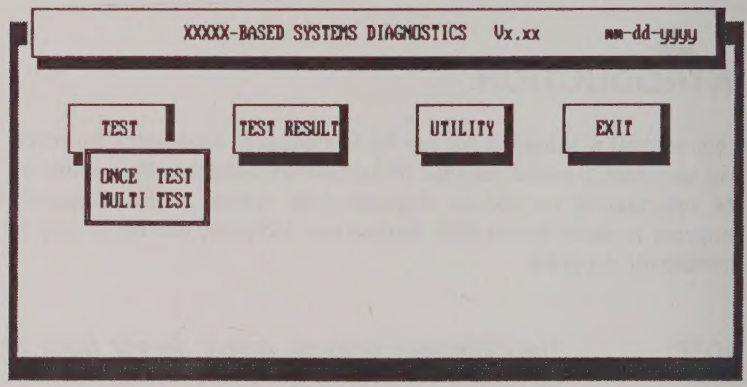
The diagnostic diskette is not a bootable disk. You must boot from the hard disk or from a bootable diskette and run the diagnostic program from drive A.

After booting your system, insert the diagnostic program diskette in drive A, at the DOS A> prompt, type:

```
diagnos
```

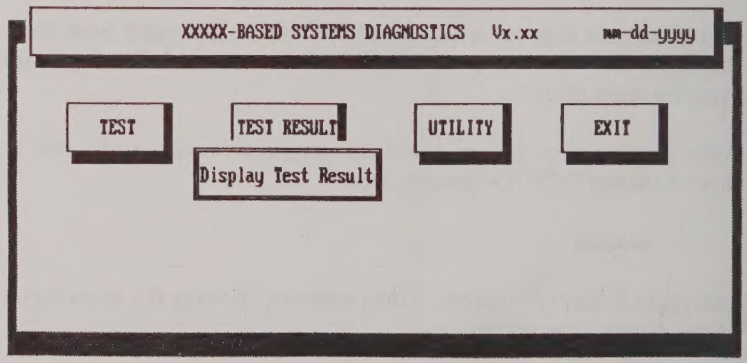
and press <Enter>. Screen 1 then appears, showing the main menu of the diagnostic program.

CAUTION: *If your system is equipped with an ESDI hard disk, do NOT use the physical format utility (HDISK.EXE) to avoid damaging your hard disk.*



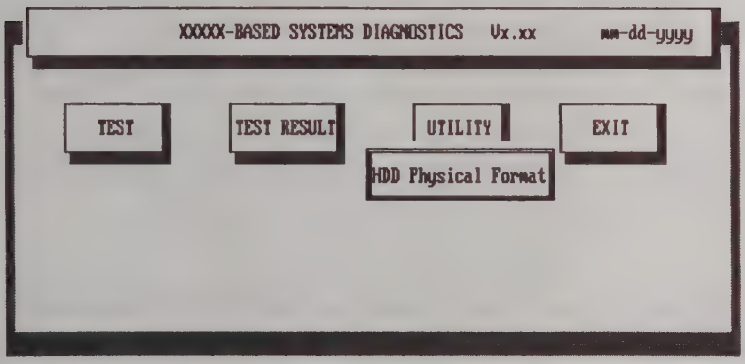
Screen 1. Main Menu (TEST option selected)

The main menu contains the options TEST, TEST RESULT, UTILITY, and EXIT. Use the right-arrow key to move the cursor to the TEST RESULT option. Screen 2 appears:



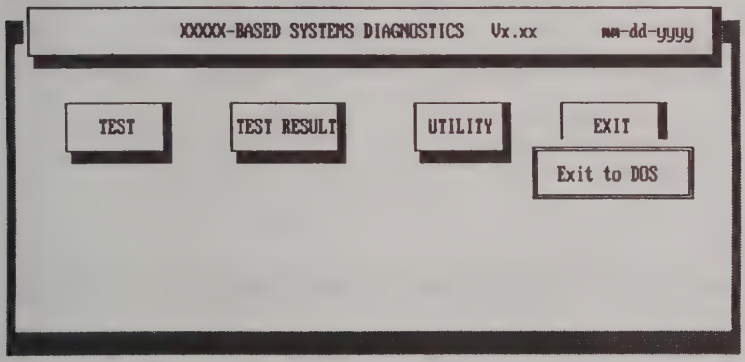
Screen 2. Main Menu (TEST RESULT option selected)

If you select the UTILITY option, Screen 3 appears:



Screen 3. Main Menu (UTILITY option selected)

To end the diagnostic program, move the cursor to the EXIT option. Screen 4 then displays. Press the <Enter> key to return to DOS.

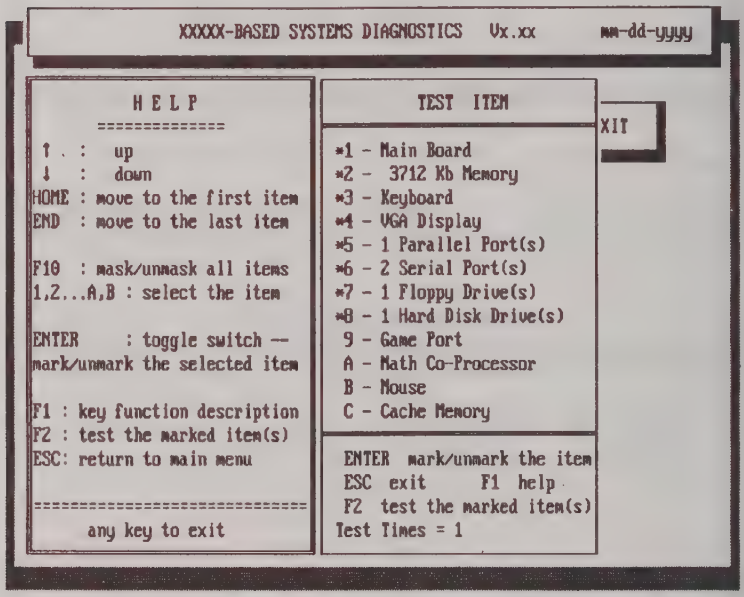


Screen 4. Main Menu (EXIT option selected)

RUNNING THE DIAGNOSTIC TESTS

To run the diagnostic tests, select TEST from the main menu. Choose ONCE TEST to test a specific item for one pass only. Select MULTI TEST to test an item for more than one pass (maximum of 9999 times).

Press <Enter> to display the TEST ITEM menu. Instructions for operating the TEST ITEM menu are given at the bottom of the menu. Press F1 to display the HELP menu.


XXXXX-BASED SYSTEMS DIAGNOSTICS Vx.xx mm-dd-yyyy
H E L P
↑ : up
↓ : down
HOME : move to the first item
END : move to the last item
F10 : mask/unmask all items
1,2...A,B : select the item
ENTER : toggle switch -- mark/unmark the selected item
F1 : key function description
F2 : test the marked item(s)
ESC: return to main menu
any key to exit
TEST ITEM
*1 - Main Board
*2 - 3712 Kb Memory
*3 - Keyboard
*4 - VGA Display
*5 - 1 Parallel Port(s)
*6 - 2 Serial Port(s)
*7 - 1 Floppy Drive(s)
*8 - 1 Hard Disk Drive(s)
9 - Game Port
A - Math Co-Processor
B - Mouse
C - Cache Memory
XIT
ENTER mark/unmark the item
ESC exit F1 help
F2 test the marked item(s)
Test Times = 1

Screen 5. Test Item Menu and Help Menu

You can mark the items to test by either entering the corresponding item numbers or highlighting an item and pressing <Enter>. Note that pressing the corresponding item numbers or <Enter> a second time unmarks the item.

You can run the test on an item only if the item is installed in your system. If the item is not installed, the following message appears:

```
The equipment isn't installed
```

To test the marked items, press F2. If no item is marked for testing, the following message appears:

```
No test item selected
```

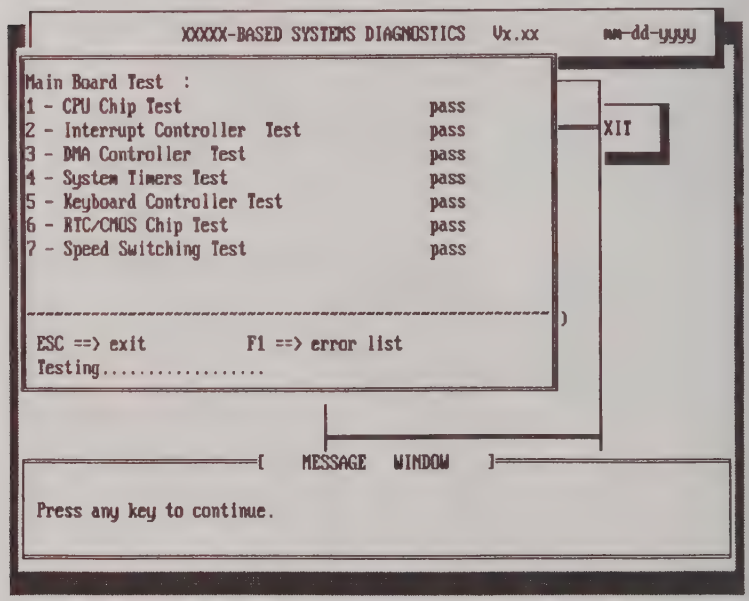
If you select ONCE TEST and press F2, the test menu of a marked item appears. After testing the first marked item, a message window appears prompting you to press any key to continue testing another marked item.

If you select the MULTI TEST option, only the TEST RESULT menu appears, showing the items that pass or fail the test.

After testing a specific item (either ONCE TEST or MULTI TEST), press F1 for more information about the error messages.

1 - Main Board Test

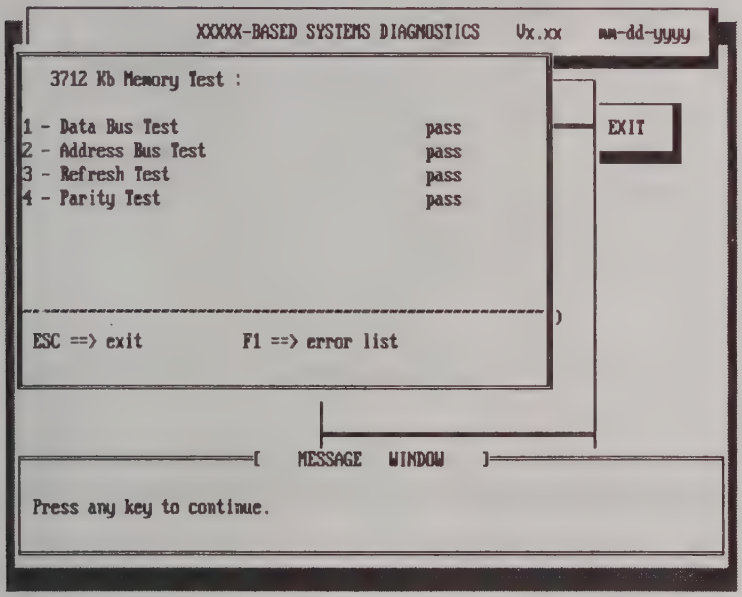
There are seven test items in the main board test. During the main board test, a musical scale sounds once while the subtests are performed. Screen 6 shows a sample test result of the main board test. If an item fails the diagnostic main board tests, a "fail" message and error codes appear.


XXXXX-BASED SYSTEMS DIAGNOSTICS Vx.xx mm-dd-yyyy
Main Board Test :
1 - CPU Chip Test pass
2 - Interrupt Controller Test pass
3 - DMA Controller Test pass
4 - System Timers Test pass
5 - Keyboard Controller Test pass
6 - RTC/CMOS Chip Test pass
7 - Speed Switching Test pass
XIT
ESC ==> exit F1 ==> error list
Testing.....
[MESSAGE WINDOW]
Press any key to continue.

Screen 6. Main Board Test

2 - Memory Test

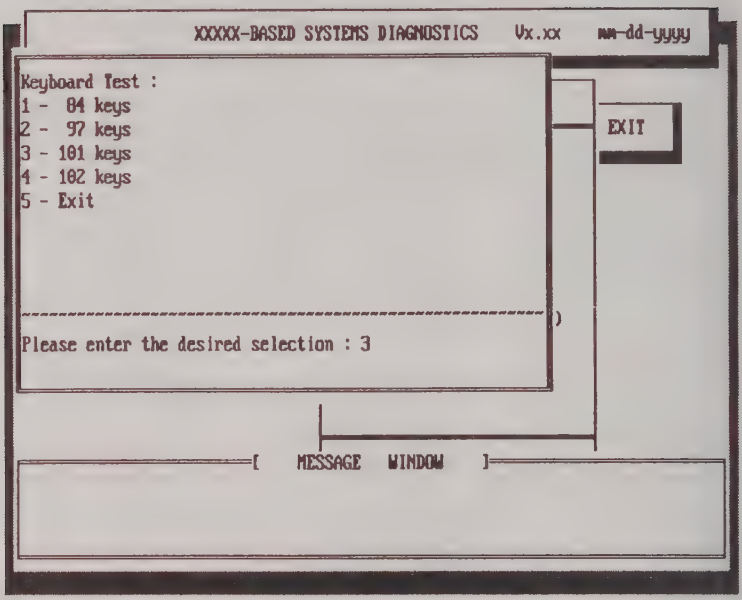
The actual amount of memory in your system is reflected on the screen, e.g. 3712 Kb in Screen 7. The memory test checks the data bus and the address bus for each memory bank. It also checks the refresh cycle and parity.


XXXXX-BASED SYSTEMS DIAGNOSTICS Vx.xx mm-dd-yyyy
3712 Kb Memory Test :
1 - Data Bus Test pass
2 - Address Bus Test pass
3 - Refresh Test pass
4 - Parity Test pass
EXIT
ESC ==> exit
F1 ==> error list
[MESSAGE WINDOW]
Press any key to continue.

Screen 7. Memory Test

3 - Keyboard Test

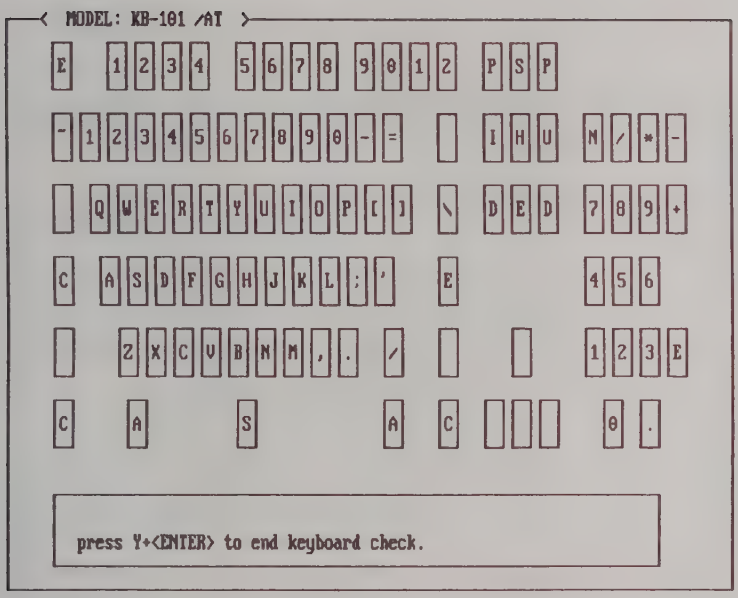
If you select the keyboard test, Screen 8 appears.



Screen 8. Keyboard Test

Enter the number that corresponds to the type of keyboard to be tested and press <Enter>. You can only test one type of keyboard at a time.

Next, a keyboard layout simulation diagram similar to Screen 9 appears.

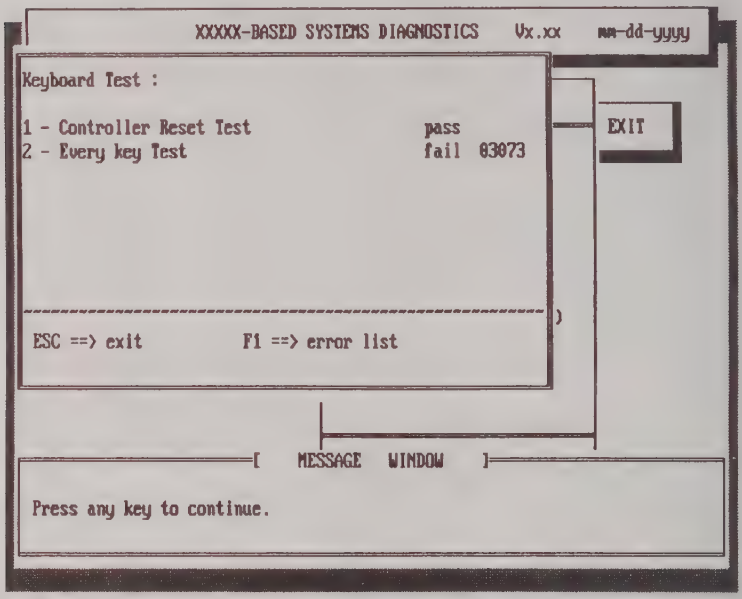


Screen 9. 101-Key Keyboard Layout

Pressing any key should erase the key's letter or symbol on its corresponding position in the diagram; otherwise, the keyboard has a problem.

Every key on the keyboard must be tested; otherwise, an error appears. After finishing the test, press Y, then <Enter>.

After testing the keyboard, the results appear as shown in Screen 10.


XXXXX-BASED SYSTEMS DIAGNOSTICS Vx.xx mm-dd-yyyy
Keyboard Test :
1 - Controller Reset Test pass
2 - Every key Test fail 03073
EXIT
ESC ==> exit F1 ==> error list
[MESSAGE WINDOW]
Press any key to continue.

Screen 10. Keyboard Test Results

If there are errors, a fail message with a corresponding error code appears.

4 - Display Card Test

This diagnostic program can test various kinds of display cards, including MDA, MGA, CGA, MGCA, EGA, PEGA, JEGA, MCGA, and VGA.

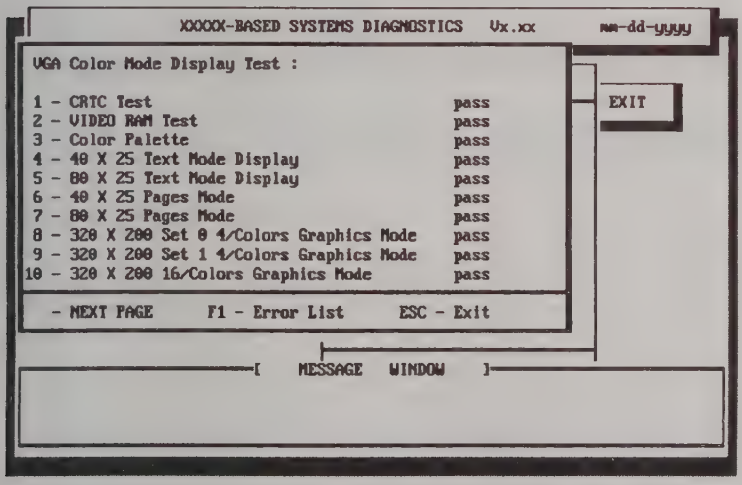
As an example we would like to briefly explain the VGA color mode display test.

A self-test runs automatically right after you select this test item. If there are no errors, the display test proceeds directly to the text mode and graphics mode tests. In each video mode, the message

```
IS THIS SCREEN CORRECT? (Y/N)
```

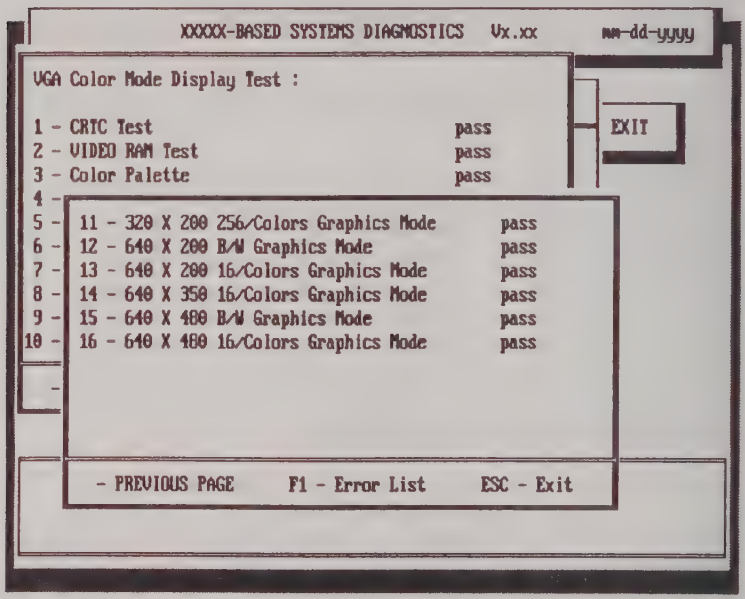
appears. Press Y if the screen is correct, or N if it is not correct. An error message appears at the conclusion of the test.

Screen 11 shows the results of the VGA color mode test.


XXXXX-BASED SYSTEMS DIAGNOSTICS Vx.xx mm-dd-yyyy
VGA Color Mode Display Test :
1 - CRTC Test pass
2 - VIDEO RAM Test pass
3 - Color Palette pass
4 - 40 X 25 Text Mode Display pass
5 - 80 X 25 Text Mode Display pass
6 - 40 X 25 Pages Mode pass
7 - 80 X 25 Pages Mode pass
8 - 320 X 200 Set 0 4/Colors Graphics Mode pass
9 - 320 X 200 Set 1 4/Colors Graphics Mode pass
10 - 320 X 200 16/Colors Graphics Mode pass
- NEXT PAGE F1 - Error List ESC - Exit
EXIT
[MESSAGE WINDOW]

Screen 11. VGA Color Mode Display Test (Page I)

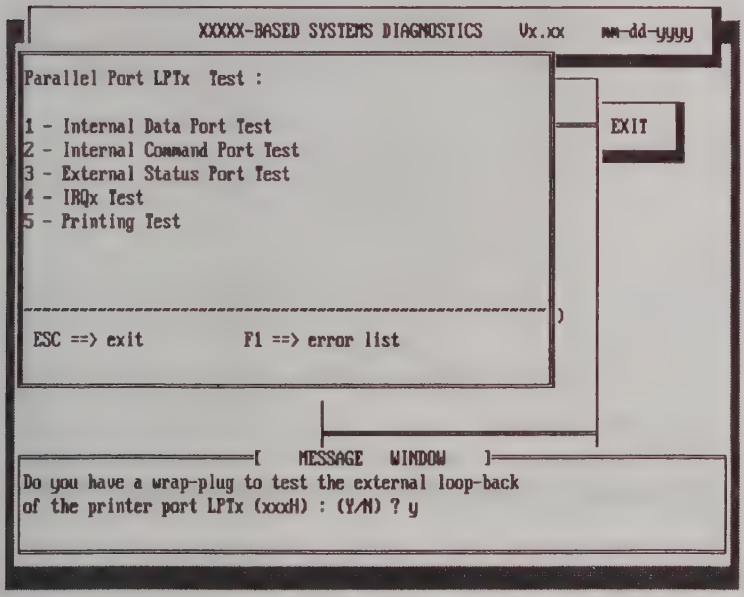
Press the down-arrow key to view the second page of test results. Screen 12 then appears.


XXXXX-BASED SYSTEMS DIAGNOSTICS Vx.xx mm-dd-yyyy
VGA Color Mode Display Test :
1 - CRTC Test pass
2 - VIDEO RAM Test pass
3 - Color Palette pass
4 -
5 - 11 - 320 X 200 256/Colors Graphics Mode pass
6 - 12 - 640 X 200 B/W Graphics Mode pass
7 - 13 - 640 X 200 16/Colors Graphics Mode pass
8 - 14 - 640 X 350 16/Colors Graphics Mode pass
9 - 15 - 640 X 480 B/W Graphics Mode pass
10 - 16 - 640 X 480 16/Colors Graphics Mode pass
EXIT
- PREVIOUS PAGE F1 - Error List ESC - Exit

Screen 12. VGA Color Mode Display Test (Page II)

5 - Parallel Port Test

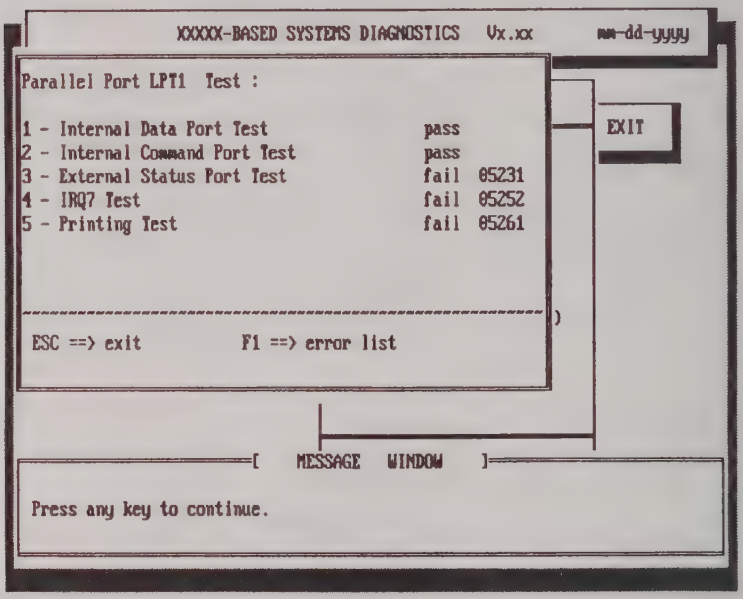
The diagnostic program can test only one parallel port that is actually installed at the time the diagnostic program was started. Screen 13 shows the parallel port test items.


XXXXX-BASED SYSTEMS DIAGNOSTICS Vx.xx mm-dd-yyyy
Parallel Port LPTx Test :
1 - Internal Data Port Test
2 - Internal Command Port Test
3 - External Status Port Test
4 - IRQx Test
5 - Printing Test
EXIT
ESC ==> exit
F1 ==> error list
[MESSAGE WINDOW]
Do you have a wrap-plug to test the external loop-back
of the printer port LPTx (xxxH) : (Y/N) ? y

Screen 13. Parallel Port Test

If you do not have a wrap-plug connected to your parallel port, type N and press <Enter>. Otherwise, press Y.

When the paralle port test is over, test results similar to Screen 14 appear.


XXXXX-BASED SYSTEMS DIAGNOSTICS Vx.xx mm-dd-yyyy
Parallel Port LPT1 Test :
1 - Internal Data Port Test pass
2 - Internal Command Port Test pass
3 - External Status Port Test fail 05231
4 - IRQ7 Test fail 05252
5 - Printing Test fail 05261
ESC ==> exit F1 ==> error list
EXIT
[MESSAGE WINDOW]
Press any key to continue.

Screen 14. Parallel Port Test with Wrap-Plug Installed

Note that if you do not have a wrap-plug, the external control line check and the interrupt (IRQ) check do not show a pass/fail message.

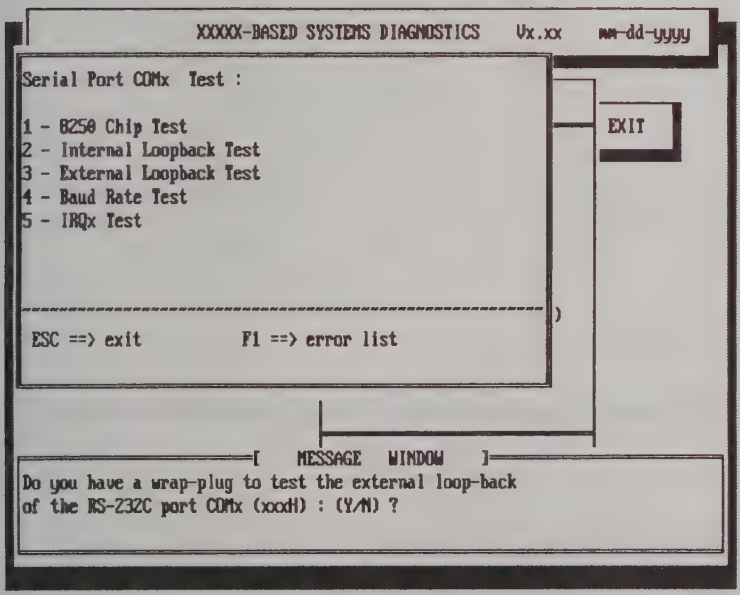
The diagnostic program then asks if you have a printer connected to your computer. If you have a printer connected, turn it on and press Y and <Enter>. The printer test then runs. If you have no printer, enter N, then press any key to return to the TEST ITEM menu.

6 - Serial Port(s) Test

The system usually supports up to two serial ports, designated as COM1 and COM2. However, only serial ports actually installed are tested.

If system switches are not properly set, you may receive a fail message. Screen 15 shows the initial test screen. Refer to Appendix B for port descriptions and I/O port addresses.

NOTE: *To run all subtests, install a serial port wrap-plug. See Appendix C for directions.*


XXXXX-BASED SYSTEMS DIAGNOSTICS Vx.xx mm-dd-yyyy
Serial Port COMx Test :
1 - 8250 Chip Test
2 - Internal Loopback Test
3 - External Loopback Test
4 - Baud Rate Test
5 - IRQx Test
EXIT
ESC ==> exit
F1 ==> error list
[MESSAGE WINDOW]
Do you have a wrap-plug to test the external loop-back
of the RS-232C port COMx (xxxH) : (Y/N) ?

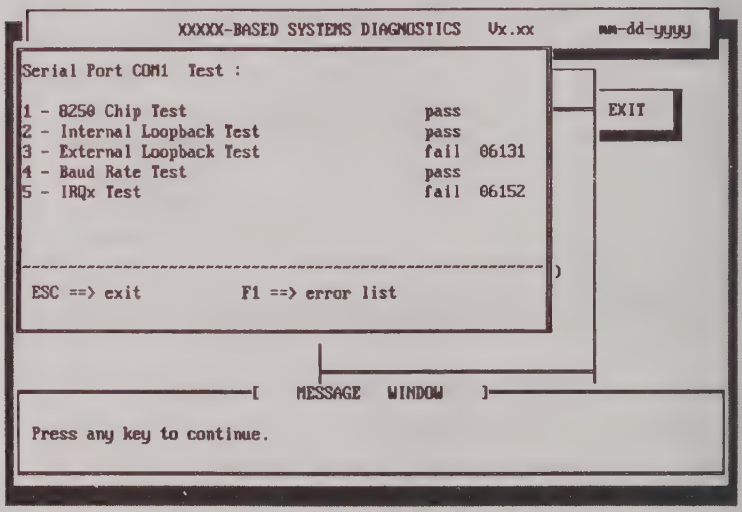
Screen 15. Serial Port(s) Test

The message window displays

```
Do you have a wrap-plug to test the external loop-
back of the RS-232C port COMx (xxxh)? (Y/N)
```

If you type Y, insert a wrap-plug in the port being tested before you press <Enter>. The wrap-plug allows testing through the connector. For details on the RS-232C wrap-plug, see Appendix C.

If you type N, the last three items cannot be tested. Screen 16 shows the test results.


XXXXX-BASED SYSTEMS DIAGNOSTICS Vx.xx mm-dd-yyyy
Serial Port COM1 Test :
1 - 8250 Chip Test pass
2 - Internal Loopback Test pass
3 - External Loopback Test fail 06131
4 - Baud Rate Test pass
5 - IRQx Test fail 06152
EXIT
ESC ==> exit
F1 ==> error list
[MESSAGE WINDOW]
Press any key to continue.

Screen 16. Serial Port(s) Test Results

To test another serial port, press any key except ESC. If your system has only one serial port, then all testing is complete and the diagnostics returns to the TEST ITEM menu.

NOTE: *When testing COM1, IRQx in item 5 is IRQ4. When testing COM2, it is IRQ3.*

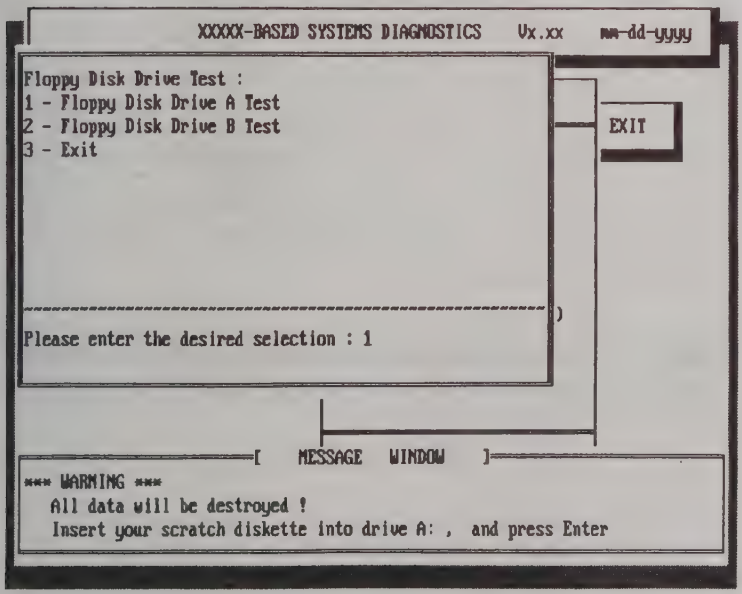
7 - Diskette Drive Test

CAUTION: *This test destroys all data on the test diskette. Be sure to use a blank, formatted diskette or a diskette with data that you no longer need.*

Press F2 to run the diskette drive test. The following message appears at the bottom of the screen.

```
Insert scratch diskette(s) into ALL Drive(s)
Press [Enter] to Continue, or [ESC] to exit.
```

Press <Enter> and Screen 17 appears. You can now select a drive for testing.

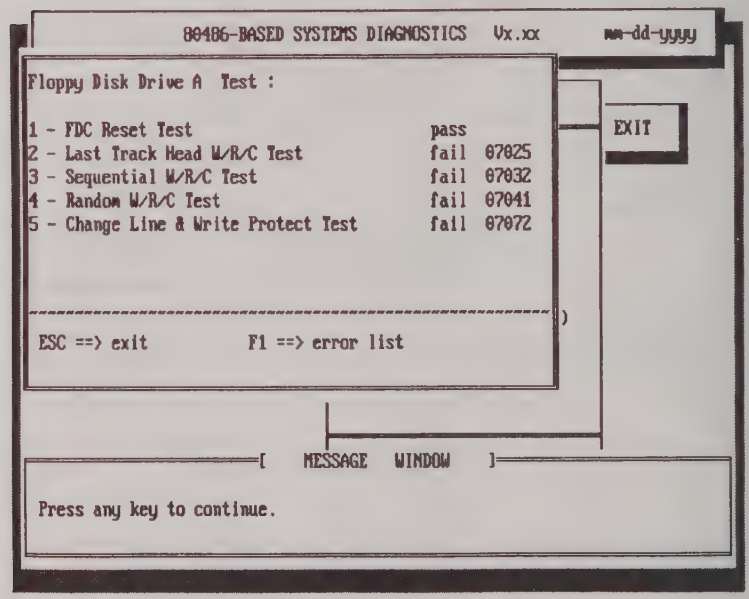

XXXXX-BASED SYSTEMS DIAGNOSTICS Vx.xx mm-dd-yyyy
Floppy Disk Drive Test :
1 - Floppy Disk Drive A Test
2 - Floppy Disk Drive B Test
3 - Exit
EXIT
Please enter the desired selection : 1
[MESSAGE WINDOW]
*** WARNING ***
All data will be destroyed !
Insert your scratch diskette into drive A: , and press Enter

Screen 17. Diskette Drive Test Menu for Two Drives

Insert a blank, formatted diskette into the drives and press <Enter>. As a precaution, the diagnostic program verifies if you really want to use the diskette you inserted:

```
Do you want to test it (Y/N)?
```

Press Y to test the diskette drive with the diskette inserted. Screen 18 shows the results of the diskette drive test.

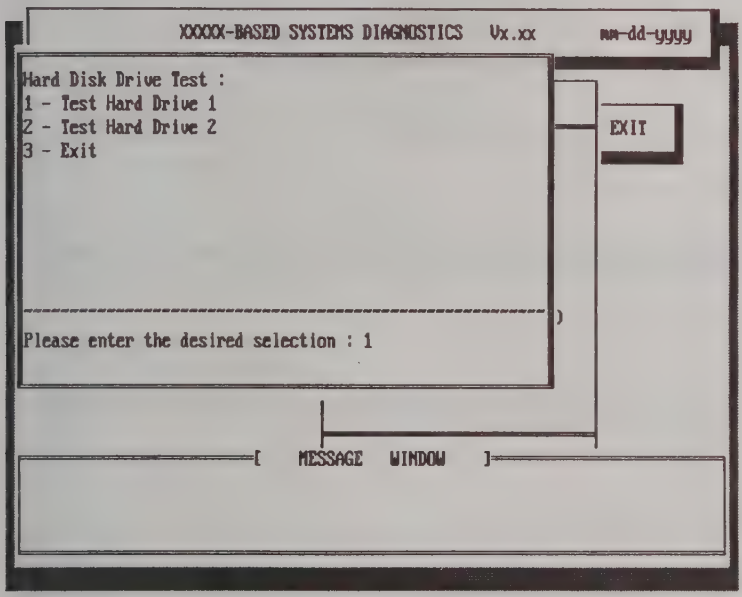

80486-BASED SYSTEMS DIAGNOSTICS Vx.xx mm-dd-yyyy
Floppy Disk Drive A Test :
1 - FDC Reset Test pass
2 - Last Track Head W/R/C Test fail 07025
3 - Sequential W/R/C Test fail 07032
4 - Random W/R/C Test fail 07041
5 - Change Line & Write Protect Test fail 07072
ESC ==> exit F1 ==> error list
EXIT
[MESSAGE WINDOW]
Press any key to continue.

Screen 18. Diskette Drive Test Results

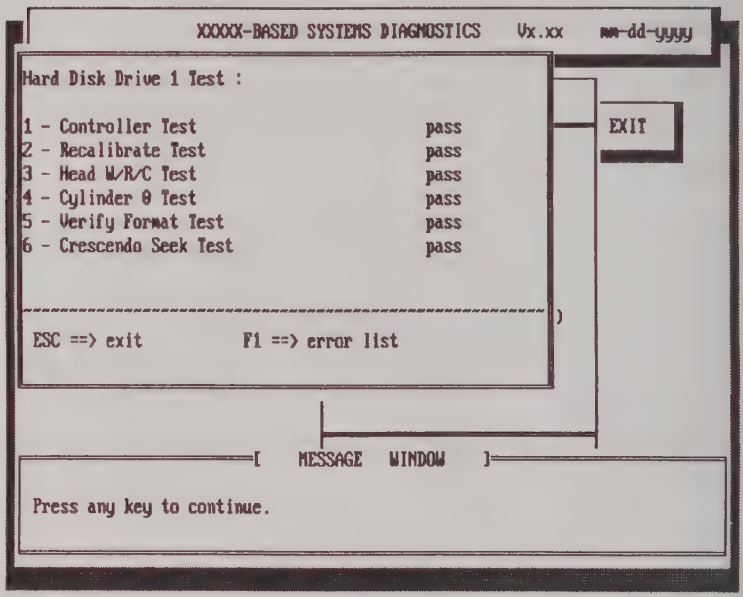
8 - Hard Disk Drive Test

The diagnostic program can test up to two hard disk drives. However, the diagnostic program only tests drives actually installed at the time the program runs. Note also that the drives must be correctly formatted prior to testing.

Screen 19 shows the hard disk drive test menu for systems with two hard disks. If your system has only one hard disk, Screen 20 appears with the test results. You do not need to specify the drive name.


XXXXX-BASED SYSTEMS DIAGNOSTICS Vx.xx mm-dd-yyyy
Hard Disk Drive Test :
1 - Test Hard Drive 1
2 - Test Hard Drive 2
3 - Exit
EXIT
Please enter the desired selection : 1
[MESSAGE WINDOW]

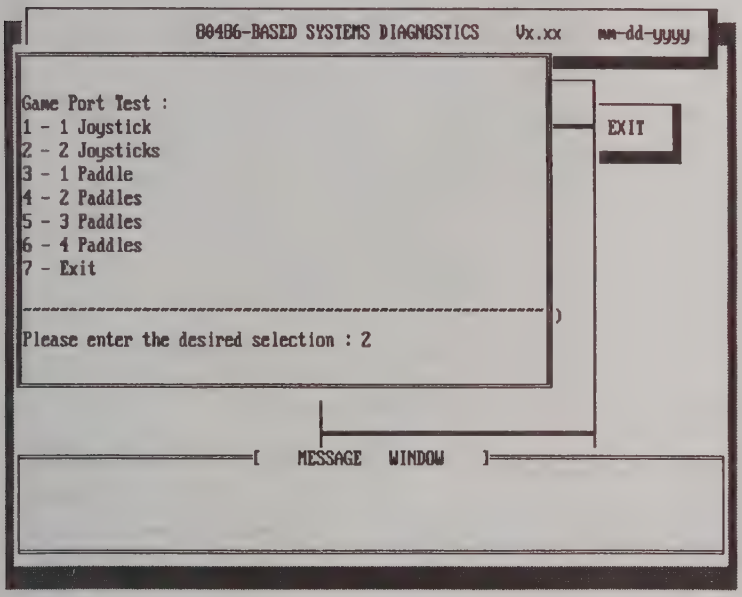
Screen 19. Hard Disk Drive Test Menu for Two Hard Disk Drives


XXXXX-BASED SYSTEMS DIAGNOSTICS Vx.xx mm-dd-yyyy
Hard Disk Drive 1 Test :
1 - Controller Test pass
2 - Recalibrate Test pass
3 - Head W/R/C Test pass
4 - Cylinder 0 Test pass
5 - Verify Format Test pass
6 - Crescendo Seek Test pass
ESC ==> exit F1 ==> error list
EXIT
[MESSAGE WINDOW]
Press any key to continue.

Screen 20. Hard Disk Drive Test Results

9 - Game Port Test

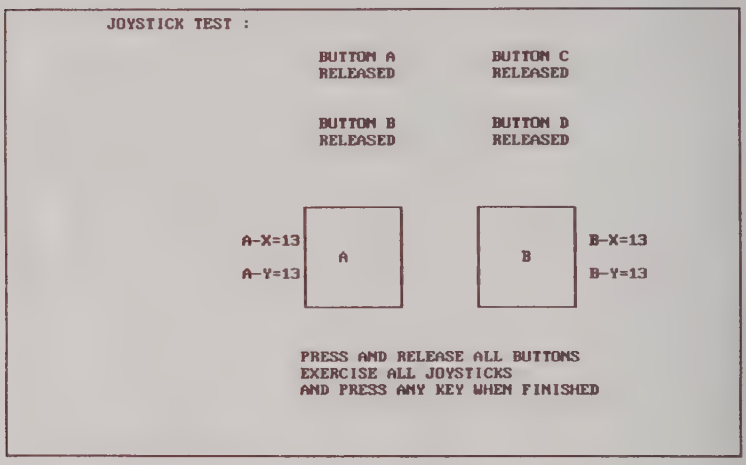
The game port test handles up to two joysticks and four paddles. Screen 21 appears when you run this test.


80486-BASED SYSTEMS DIAGNOSTICS Vx.xx mm-dd-yyyy
Game Port Test :
1 - 1 Joystick
2 - 2 Joysticks
3 - 1 Paddle
4 - 2 Paddles
5 - 3 Paddles
6 - 4 Paddles
7 - Exit
Please enter the desired selection : 2
EXIT
[MESSAGE WINDOW]

Screen 21. Game Port Test

Select items 1 to 6 according to the number of joysticks or paddles installed in your system.

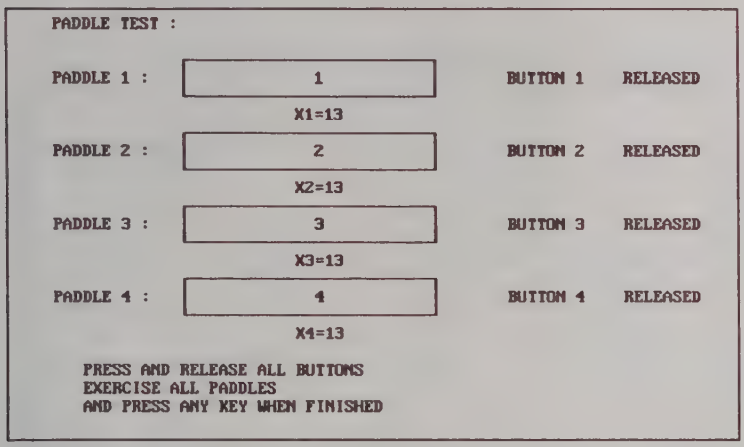
Screen 22 shows the test screen for two joysticks.



Screen 22. Test Screen for Two Joysticks

To test the joystick, press and release the buttons. Screen messages indicate the functional status of the buttons. Follow the press-and-release test for all joysticks and check out the screen messages.

The diagnostic program only tests and displays the actual number of paddles installed in your system. Screen 23 shows a sample screen for the four-paddle test.



Screen 23. Test Screen for Four Paddles

Test each paddle by pressing and releasing the paddle buttons and monitoring the screen messages. Then move the paddles and note the screen messages.

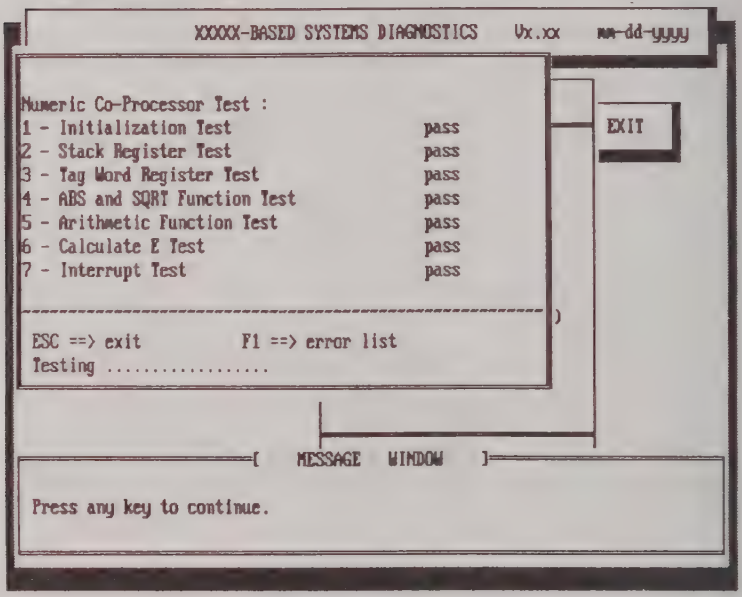
If the game port tests are successful, a pass message appears opposite the item being tested. Press any key to return to the game port test menu, and exit the game port test.

NOTE: *If any of the items fails the test, a fail message with a corresponding error code appears.*

A - Numeric Coprocessor Test

This test checks the numeric coprocessor (if it is installed in your system).

Screen 24 shows the results of a successful numeric coprocessor test.

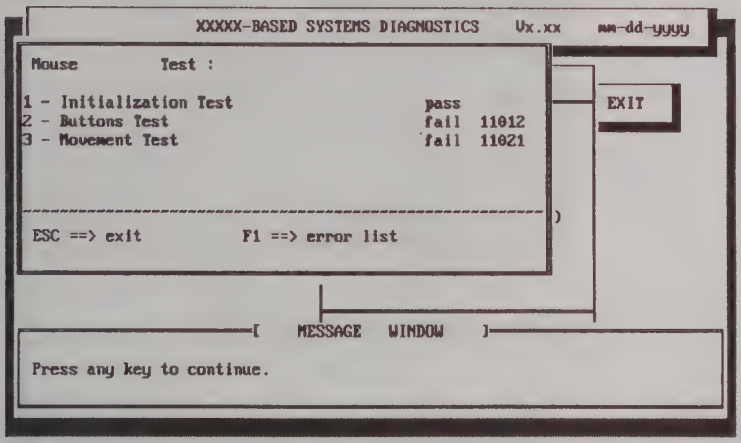

XXXXX-BASED SYSTEMS DIAGNOSTICS Vx.xx mm-dd-yyyy
Numeric Co-Processor Test :
1 - Initialization Test pass
2 - Stack Register Test pass
3 - Tag Word Register Test pass
4 - ABS and SQRT Function Test pass
5 - Arithmetic Function Test pass
6 - Calculate E Test pass
7 - Interrupt Test pass
ESC ==> exit F1 ==> error list
Testing .....
EXIT
[MESSAGE WINDOW]
Press any key to continue.

Screen 24. Numeric Coprocessor Test

If any of the subtests fail, a fail message with a corresponding error code appears.

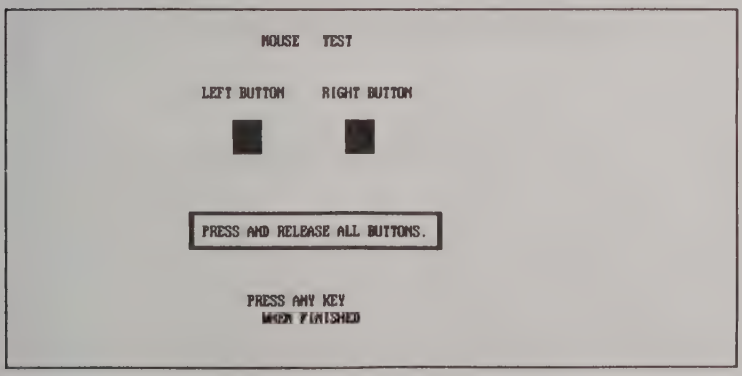
B - Pointing Device Test

The pointing device test checks the mouse installed in your system. Screen 25 shows the initial test menu.


XXXXX-BASED SYSTEMS DIAGNOSTICS Vx.xx mm-dd-yyyy
Mouse Test :
1 - Initialization Test pass
2 - Buttons Test fail 11012
3 - Movement Test fail 11021
EXIT
ESC ==> exit F1 ==> error list
MESSAGE WINDOW
Press any key to continue.

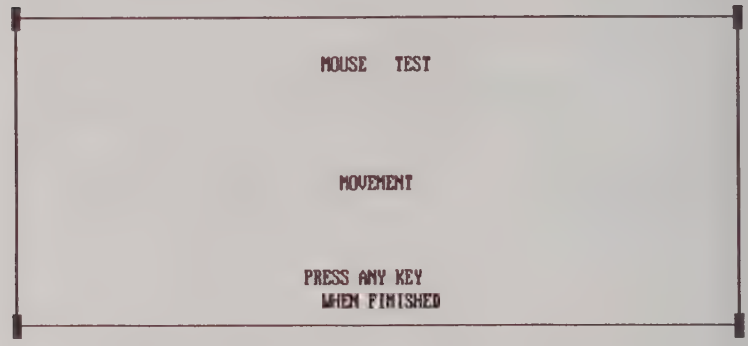
Screen 25. Pointing Device Test

Select item 2 to test the mouse buttons. Screen 26 appears.



Screen 26. Test Screen for Mouse Buttons

Select item 3 to test the mouse movement. The following screen appears:

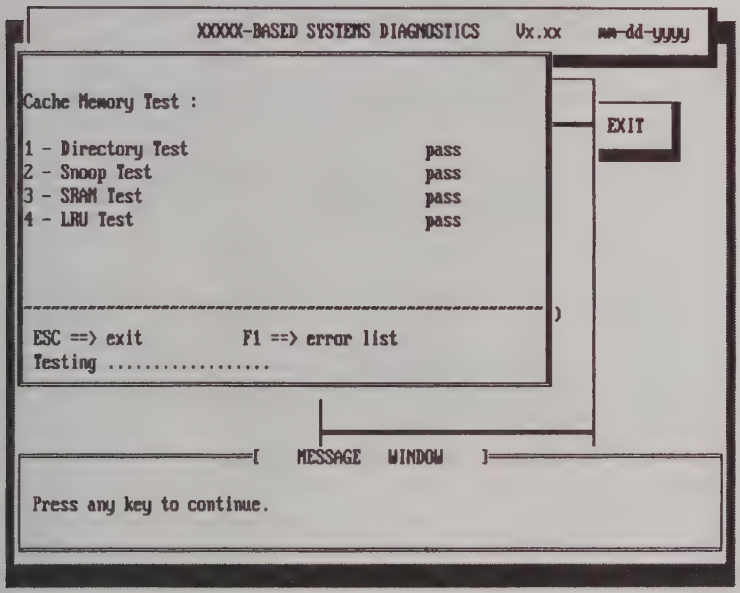


Screen 27. Test Screen for Mouse Movement

NOTE: *If any of the items fails the test, a fail message with a corresponding error code appears in the test result screen.*

C - Cache Memory Test

There are four subtests in the cache memory test menu — directory, snoop, SRAM, and LRU tests. Screen 28 shows a successful cache memory test.


XXXXX-BASED SYSTEMS DIAGNOSTICS Vx.xx mm-dd-yyyy
Cache Memory Test :
1 - Directory Test pass
2 - Snoop Test pass
3 - SRAM Test pass
4 - LRU Test pass
EXIT
ESC ==> exit F1 ==> error list
Testing .....
[MESSAGE WINDOW]
Press any key to continue.

Screen 28. Cache Memory Test

To exit to the TEST ITEM menu, press any key.

DISPLAYING ALL TEST RESULTS

After running the diagnostic tests, you can view the results of all the tests you have just performed. To do this, select TEST RESULT in the main menu. The following message appears:

```
Display Test Result
```

Press <Enter>. Screen 29 shows the number of passes and fails for each item tested.

XXXXX-Based Systems Diagnostics Test Result

TEST ITEM	Pass	Fail	TEST ITEM	Pass	Fail
1 - Main Board	0002	0000	9 - Game Port	0000	0000
2 - 3712 Kb Memory	0002	0000	10 - Math Co-Processor	0000	0000
3 - Keyboard	0002	0000	11 - Mouse	0000	0000
4 - Enhanced Graphics Card	0002	0000	12 - Cache Memory	0000	0000
5 - 1 Parallel Port(s)	0000	0002	13 - Reserved		
6 - 2 Serial Port(s)	0000	0002	14 - Reserved		
7 - 1 Floppy Drive(s)	0002	0000	15 - Reserved		
8 - 1 Hard Disk Drive(s)	0000	0000	16 - Reserved		

ESC ==> exit F1 ==> error list

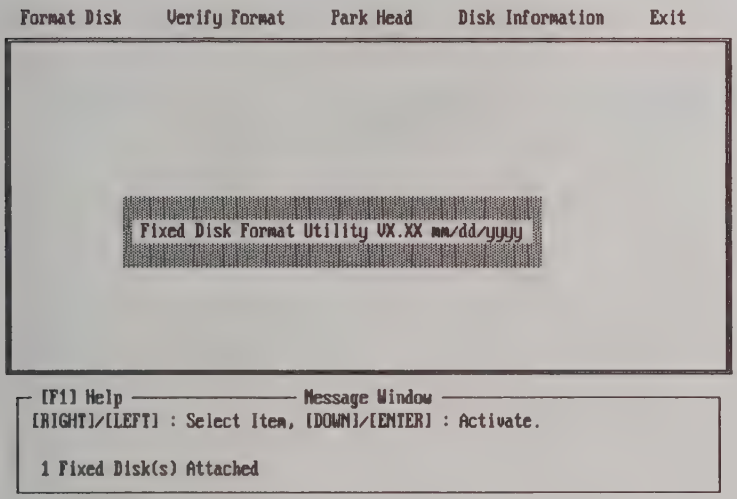
Screen 29. Diagnostics Test Results

RUNNING THE UTILITY TEST

To run the utility test, select UTILITY in the main menu. The following message appears:

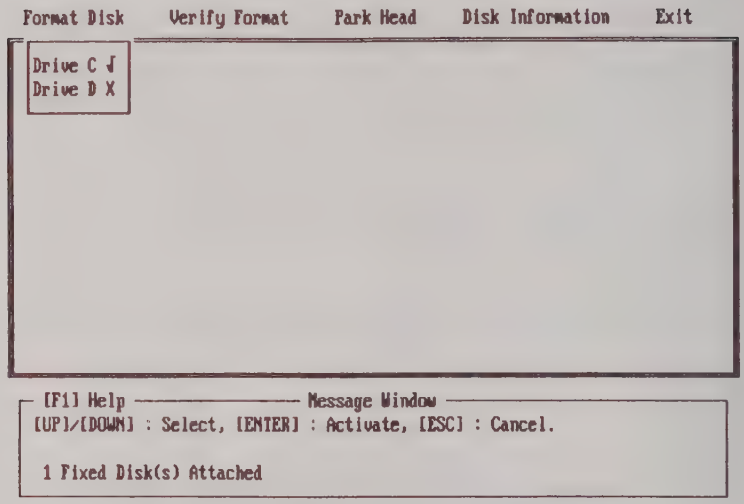
```
HDD Physical Format
```

Press <Enter>. Screen 30 appears. The Fixed Disk Format Utility includes the Format Disk, Verify Format, Park Head, Disk Information and Exit options.



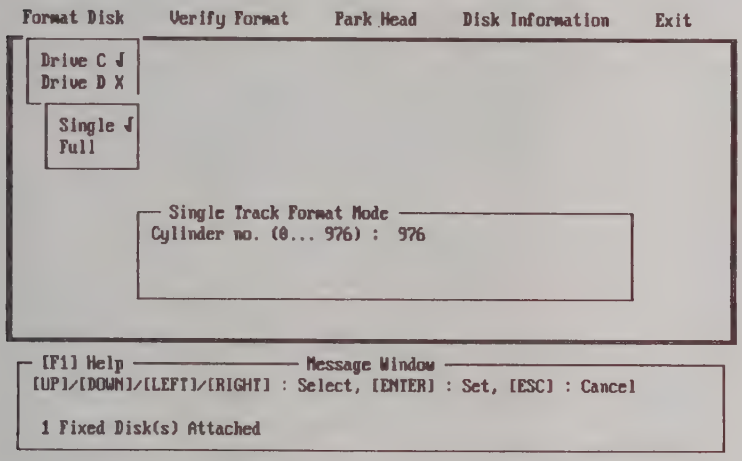
Screen 30. Fixed Disk Format Utility

If you select the Format Disk option, Screen 31 appears:

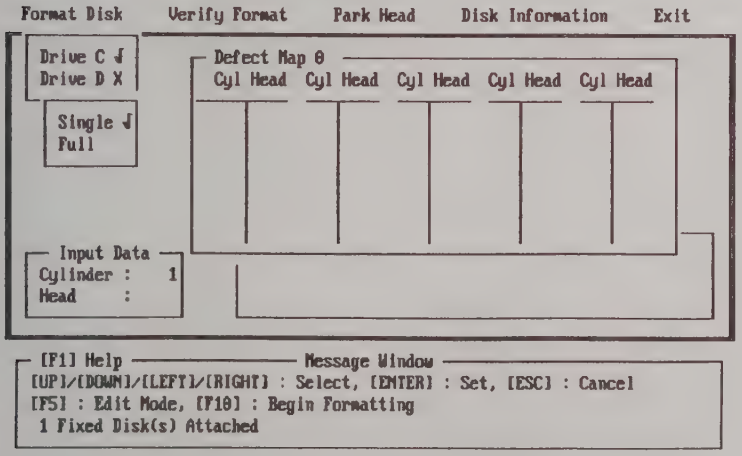


Screen 31. Fixed Disk Physical Format

Screen 32 and 33 shows the operation of the single track format and full disk format.

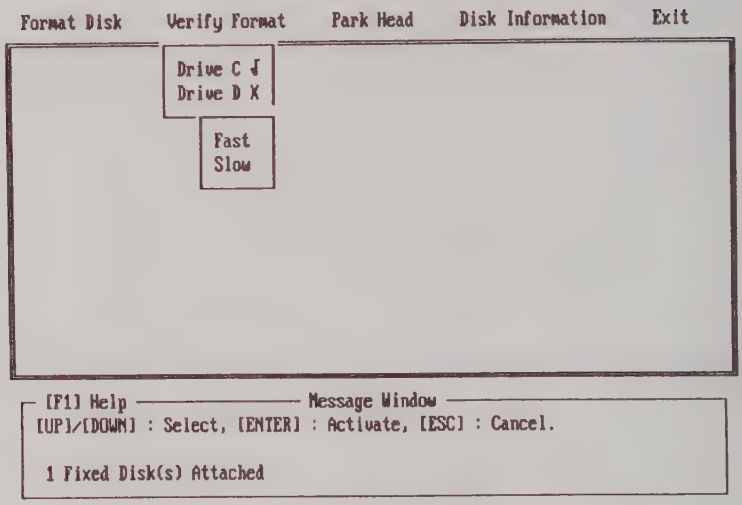


Screen 32. Fixed Disk Single Track Format



Screen 33. Fixed Disk Full Disk Format

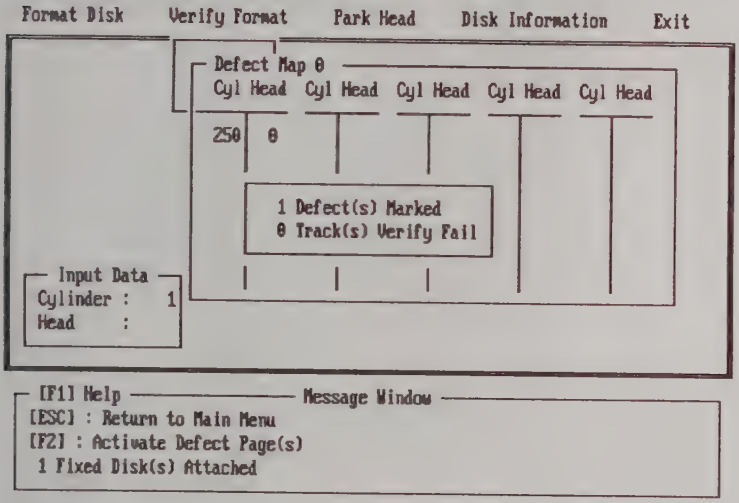
If you select the Verify Format option, Screen 34 appears.



Screen 34. Fixed Disk Format Utility

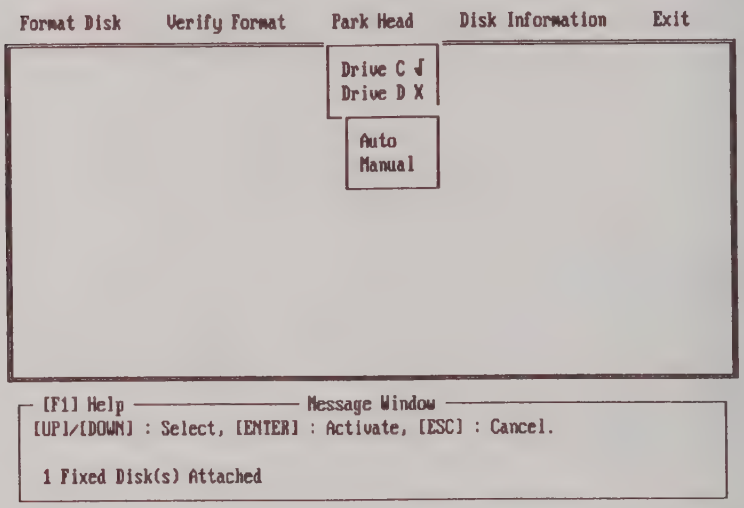
The above program reads the disk sequentially one track at a time starting from Cylinder 0 and tests all the disk heads for each cylinder.

You can choose either Fast or Slow for Verify Format. If you select Fast, the program verifies only Sector 0 on each track. Screen 35 shows an example of Verify messages.



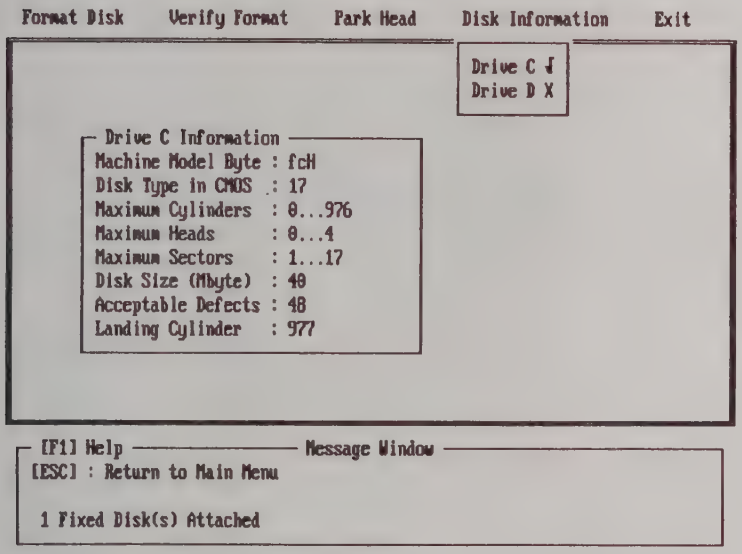
Screen 35. Verify Format Message

The Park Head option is used to park the disk head. There are two options: Auto Park and Manual Park. Auto Park parks the disk head to the farthest cylinder, while Manual Park parks the disk head to a user-defined cylinder. Screen 36 shows the Parking Head message.



Screen 36. Parking Head Message

Disk Information shows you some information about the selected disk. Screen 37 show an example message.



Screen 37. Disk Information Message

To end the Utility, move the cursor to Exit and press <Enter>.

Error Codes

This appendix lists all error codes appearing in test screens and corresponding tests. Please refer to the README file in the diskette for up-to-date information.

Main Board Test

Item	Code
1. Main Board Test:	
- CPU Chip Test	
<1>. 8088 compatible mode error	01111
- Interrupt Controller Test	
<1>. IMR R/W test (8259 A)	01211
<2>. IMR R/W test (8259 B)	01212
<3>. IRQ0 test	01221
<4>. Unexpected IRQ test (8259 A)	01231
<5>. Unexpected IRQ test (8259 B)	01232
- DMA Controller Test	
<1>. DMA0 current address register R/W test	01300
<2>. DMA0 current word count register R/W test	01301
<3>. DMA1 current address register R/W test	01310
<4>. DMA1 current word count register R/W test	01311
- System Timers Test	
<1>. NO IRQ0 generated	01410
<2>. Timer 1 test error (RREQ times too low)	01411
<3>. Timer 1 test error (RREQ times too high)	01412
<4>. Timer 2 latch test error	01421
<5>. Timer 3 (watchdog) error	01431-0143

Main Board Test

Item	Code
- Keyboard Controller Test	
<1>. Read command byte test	01501
<2>. Write command byte test	01502
<3>. Selftest test	01511
<4>. Keyboard interface test	01512
<5>. Auxiliary device intercface test	01513
<6>. Disable KBD interface test	01521
<7>. Enable KBD interface test	01522
<8>. Disable AUX interface test	01523
<9>. Enable AUX interface test	01524
- RTC/CMOS RAM Test	
A. Type 58167	
<1>. Counter or latch reset error	01611
<2>. Latch R/W error	01612
<3>. Counter R/W error	01613
<4>. Counter Roll_Over error	01614
<5>. Interrupt error	01615
B. Type 146818	
<1>. 146818 R/W test	01621
<2>. No interrupt test	01622
<3>. 146818 REG. C test (without INT.)	01623
<4>. 146818 REG. C test (with INT.)	01624
<5>. Update count test	01625
<6>. RTC_TMR0 INT. count too low	01626
<7>. RTC_TMR0 INT. count too high	01627
<8>. CMOS RAM R/W type1 test	01628
<9>. CMOS RAM R/W type2 test	01629
<10>. Expanded CMOS RAM test (MCA)	01630
<11>. Expanded CMOS RAM test (EISA)	01631

Main Board Test (continued)

Item	Code
- Speed Switching Test	
<1>. 8088-based series speed switching error	01712
<2>. 1033-based series speed switching error	01713
<3>. 910/915-based series speed switching error	01721
<4>. 915P or V-based series speed switching error	01722
<5>. 80386-6MHZ switching error	01730
<6>. 80386-8MHz switching error	01731
<7>. 80386-Top mode switching error	01732
<8>. 80386-10MHZ switching error	01734
<9>. 80386-12MHZ switching error	01735
<10>.80386-PC mode switching error	01737
<11>.80386-Smart mode switching error	01738
<12>.Bios - top speed switching error	01740
<13>.Bios - low speed switching error	01741
<14>.Bios - smart mode switching error	01742

Memory Test (Onboard Memory)

Item	Code
<1>. Data bus test	02001
<2>. Address bus test	02002
<3>. Refresh test	02003
<4>. Parity test	02004
<5>. 710 expansion memory	02005
<6>. 710 switch setting	02006
<7>. EMS function error	02007
<8>. Shadow RAM function error	02008
<9>. Memory controller	02009

Keyboard Test

Item	Code		
	XT	1030	AT
<1>. Controller reset test	03011	03111	03213
Receive Incorrect Code	03012	None	None
<2>. Six keys test	03031	03131	03132
<3>. KB 084 every key test	03041	03141	03241
<4>. KB 097 every key test	03042	03142	03242
<5>. KB 101 every key test	03043	03143	03243
<6>. KB 102 every key test	03044	03144	03244
<7>. KB 123 every key test	03045	None	03245
<8>. KB 82 every key test	None	None	03482
<9>. KB 83 every key test	None	None	03483
<10>.KB 82+keypad every key test	None	None	03499
<11>.KB 83+keypad every key test	None	None	03400
<12>.KB 86 every key test (for portables only)	None	None	03486
<13>. KB 87 every key test (for portables only)	None	None	03487

Display Test

Item	Code
<1>. VIDEO CONTROL CHIP	04101
VGA SEQUENCER PATTERN TEST	04102
VGA GRAPHIC PATTERN TEST	04103
VGA ATTRIBUTE PATTERN TEST	04104
Vertical Sync. bit test	04105
<2>. VIDEO RAM PATTERN TEST	04201
<3>. VGA RAMDAC MASK REGISTER TEST	04301
VGA RAMDAC DATALINE TEST	04302
VGA RAMDAC ADDRESSLINE TEST	04303
VGA RAMDAC dataline & addressline	04305
<5>. 40X25 MODE	04005
<6>. 80X25 MODE	04006
<7>. 80X43 MODE	04007
<8>. 132X25(color) MODE	04008
<9>. 132X25 B/W MODE	04009
<10>. 132X43(color) MODE	04010
<11>. 132X43 B/W MODE	04011
<12>. PAGES 40X25	04012
<13>. PAGES 80X25	04013
<14>. 320X200 PALETTE0 4 COLOR MODE	04014
<15>. 320X200 PALETTE1 4 COLOR MODE	04015
<16>. 320X200 16 color MODE	04016

Display Test (continued)

Item	Code
<17>. 640X200 B/W MODE	04017
<18>. 320X200 256/256K MODE	04018
<19>. 640X200 PALETTE0 OF MGC	04019
<20>. 640X200 PALETTE1 OF MGC	04020
<21>. 640X200 16 color MODE	04021
<22>. 640X350 MONO. MODE	04022
<23>. 640X350 16 color	04023
<24>. 640X480 B/W MODE	04024
<25>. 640X480 16 color MODE	04025
<26>. JEGA SUPERIMPOSE MODE	04026
<27>. 720X348 PAGE0 OF MGA	04027
<28>. 720X348 PAGE1 OF MGA	04028
<29>. CGA-EMULATION OF VIO	
EMU. 40x25 TEXT Mode	04401
EMU. 80x25 TEXT Mode Test	04402
EMU. 320x200 4 Grey Scales	04403
EMU. 640x200 B/W Gr.Mode	04404
<30>. 800X600 16 color MODE	04030
<31>. 800X600 B/W MODE	04031
<32>. 640X400 256/256K MODE	04032
<33>. 132X50(color) MODE	04033
<34>. Svga_1024x768_interlace color mode	04034

Parallel Port LPTx Test

Item	Code		
PORT	3BCH	378H	278H
- Internal Data Port Test	05111	05211	05311
- Internal Command Port Test			
<1>. Strobe	05121	05221	05321
<2>. Autofeed	05122	05222	05322
<3>. Initialize	05123	05223	05323
<4>. Select	05124	05224	05324
- External Data Port Test			
<1>. Error	05131	05231	05331
<2>. Selected	05132	05232	05332
<3>. Paper end	05133	05233	05333
<4>. Acknowledge	05134	05234	05334
<5>. Busy	05135	05235	05335
- IRQx Test			
<1>. Dummy int	05151	05251	05351
<2>. Real int	05152	05252	05352
- Printing Test			
<1>. No printer connector	05161	05261	05361
<2>. Printer cannot be selected	05162	05262	05362
<3>. Initialization error	05163	05263	05363
<4>. Paper busy	05164	05264	05364
<5>. Printer busy	05165	05265	05365
<6>. Unexpected error	05166	05266	05366
<7>. Printing error	05167	05267	05367
<8>. Unknown error	05168	05268	05368
- External Status Port Test			
<1>. Busy	05171	05271	05371
<2>. Error	05173	05273	05373
<3>. Paper end	05175	05275	05375
- External Command Port Test			
<1>. Strobe	05176	05276	05376
<2>. Autofeed	05177	05277	05377
<3>. Initialize	05178	05278	05378
<4>. Select	05179	05279	05379

Serial Port COM Test

Item	Code	
	COM1	COM2
- 8250 Chip Test		
<1>. Line control register	06111	06211
<2>. Interrupt enable register	06112	06212
<3>. Modem status register	06113	06213
<4>. Interrupt identification register 06114	06214	
<5>. Relation b/w MCR and MSR 06115	06215	
<6>. Modem control register	06116	06216
<7>. Internal INT test 06117	06217	
- Internal Loopback Test 06121	06221	
- External Loopback Test		
<1>. External 1 (5 bits word length) 06131	06231	
<2>. External 2 (6 bits word length) 06132	06232	
<3>. External 3 (7 bits word length) 06133	06233	
<4>. External 4 (8 bits word length) 06134	06234	
<5>. framing error	06135	06235
<6>. parity error	06136	06236
- RI and CD Test	06137	06237
- Baud Rate Test		
<1>. 9600 bps 06141	06241	
<2>. 4800 bps 06142	06242	
<3>. 2400 bps 06143	06243	
<4>. 1200 bps 06144	06244	
<5>. 600 bps 06145	06245	
- IRQx Test		
<1>. IRQ4 off 06151	None	
<2>. IRQ4 on 06152	None	
<3>. IRQ3 off None	06251	
<4>. IRQ3 on None	06252	
- External TxRx(IRQ4 off) 06161	06261	

Floppy Disk Drive Test

Item	Code	
	Drive A	Drive B
- FDC reset test	07111	07211
- Last track head F/W/R/C/V test	0712x	0722x
	(x=1 to x=4)	
- Sequential R/W test	0713x	0723x
	(x=1 to x=2)	
- Random W/R/C test	07141	07241
- Change line test	07171	07271
Write protect test	07172	07272
Read write-protection test	07173	07273
- Allocate memory fail	07099 (DRIVER A&B)	
	Notice : x --> 1 = Write ?	
	--> = item (1 -- 7)	
	2 = Read	
	3 = Compare	
	4 = Format	
	5 = Verify	

Fixed Disk Drive Test

Item	Code	
	Drive 0	Drive 1
- Controller Test		
<1>. RAM Diagnostic Fail (8088,8086 only)	08111	08211
<2>. Drive Diagnostic Fail (8088,8086 only)	08112	08212
<3>. Internal Diagnostic Fail (80X86 only)	08113	08213
<4>. Reset Fail	08114	08214
- Recalibrate Test	08121	08221
- Head Write/Read/Compare Test		
<1>. Allocation Memory Fail	08130	08230
<2>. Backup Data of Head 0,Sector 10 Fail	08131	08231
<3>. Write Head Pattern Fail	08132	08232
<4>. Read Head Pattern Fail	08133	08233
<5>. Compare Head Pattern Error	08134	08234
<6>. Write Test Pattern Fail	08135	08235
<7>. Read Test Pattern Fail	08136	08236
<8>. Compare Test Pattern Error	08137	08237
<9>. Restore Data of Head 0,Sector 10 Fail	08138	08238
- Cylinder 0 Test		
<1>. Read ID field Fail	08141	08241
<2>. Read data field Fail	08142	08242
- Verify Format Test		
<1>. Read ID field Fail	08151	08251
<2>. Read Data Field Fail	08152	08252
<3>. Defect Exceed Acceptable Range	08153	08253
<4>. Write Defect to Floppy Disk Fail	08154	08254
- Crescendo Seek Test		
<1>. Seek Fail	08161	08261
<2>. Seek Time out (Exceed 1 Second)	08162	08262

Fixed Disk Drive Test (continued)

Item	Code	
- Random Write/Read/Compare Test		
<1>. Can't Find Enough Tracks to Test	08170	08270
<2>. Write Test Pattern Fail	08171	08271
<3>. Read Test Pattern Fail	08172	08272
<4>. Compare Test Pattern Error	08173	08273
<5>. Allocate Memory Fail	08174	08274
<6>. Backup Original Data Fail	08175	08275
<7>. Restore Original Data Fail	08176	08276

Game Port Test

Item	Code
<1>. Button A test error	09011
<2>. Button B test error	09012
<3>. Button C test error	09013
<4>. Button D test error	09014
<5>. Joystick A test error	09021
<6>. Joystick B test error	09022
<7>. Paddle A test error	09031
<8>. Paddle B test error	09032
<9>. Paddle C test error	09033
<10>. Paddle D test error	09034

Numeric Coprocessor Test

Item	Code
<1>. Initialization test	10011
<2>. Stack register test	10021
<3>. Tag word register test	10022
<4>. ABS and SQRT function test	10031
<5>. Arithmetic function test	10032
<6>. Calculate E test	10033
<7>. Interrupt test	10041

Pointing Device Test

Item	Code
<1>. Initialization - default value test	11001
- enable/disable mouse test	11002
- sample rate test	11003
- resolution test	11004
- scaling test	11005
<2>. Left button test	11011
- Right button test	11012
<3>. Movement test	11021

Cache Memory Test

Item	Code
<1>. Directory test	12001
<2>. Snooping	12002
<3>. Cache RAM	12003
<4>. LRU test	12004
<5>. Dirty test	12005
<6>. Internal directory test	12006
<7>. Internal snooping	12007
<8>. Internal cache RAM	12008
<9>. Internal LRU test	12009

Modem Test

Item	Code	
	COM1 Port	COM2 Port
<1>. NV_RAM Test	13022-13027	13522-13527
<2>. LAL Test	13032-13035	13532-13535
<3>. RELAY & SPEAKER Test	13042-13045	13542-13545
<4>. Operator Break	13088	13588

Parallel and Serial Port Addresses

Table B-1 shows the parallel and serial I/O port addresses.

Table B-1. Parallel and Serial Port Addresses

I/O Port	Address (hex)	IRQ No.
Parallel Port		
LPT1	3BC	7
LPT1 or LPT2	378	7
LPT1 or LPT2 or LPT3	278	5
Serial Port		
COM1	3F8	4
COM2	2F8	3

The 80486-based systems come with one onboard parallel port that is set to address 3BC, 378, or 278. At system setup, only one address can be selected. Hence, no priority exists for the onboard parallel port. The selected address will be designated as LPT1. However, if the user installs expansion cards, address priority comes into play.

Table B-2 shows the priority and designation of the parallel ports if cards are added.

Table B-2. Parallel Port Addresses, Priority and Designation

Parallel Port (Addresses)	Priority	Designation
3BCh	Highest priority	LPT1
378h	Second priority	LPT2
278h	Lowest priority	LPT3

Test Wrap-Plug Connectors

Table C-1. Connections for the 25-Pin, D-Type Male Wrap-Plug (printer adapter connected)

Pin Number	Connect to (Pin Number)
2	15
3	13
4	12
5	10
6	11

Table C-2. Connections for the 9-pin, D-Type Female Wrap-Plug (RS-232 adapter connected)

Pin Number	Connect to (Pin Number)
3	2
7	8
1	8
6	4
6	9

Table C-3. Connections for the 25-pin, D-Type Female Wrap-Plug (RS-232 adapter connected)

Pin Number	Connect to (Pin Number)
2	3
4	5
5	8
6	20
20	22

NOTE: *Unspecified pins are not connected.*

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